UNITED
NATIONS

A

General Assembly

Distr.
LIMITED

A/AC.105/L.197
22 June 1992
ENGLISH
ORIGINAL: RUSSIAN

COMMITTEE ON THE PEACEFUL USES OF
OUTER SPACE
Thirty-fifth session
15-26 June 1992
Agenda item 10

SPIN-OFF BENEFITS OF SPACE TECHNOLOGY

Working paper submitted by the Russian Federation

Review of the current situation regarding the use of spin-off benefits of space technology and possibilities for the application of advanced technology in the context of international cooperation

Space technology affords the possibility of developing unique materials for the broadest range of scientific and economic applications.

The emergence of new forms and systems of space technology calls for non-traditional approaches to developing fundamentally new design decisions and processes and the creation of new materials, equipment, plant, experimental units and up-to-date production systems. This experience, and the very latest findings in the creation of space technology, are utilized in the national economy and may be offered to promote cooperation in the use of space for peaceful purposes.

Work is being actively carried out in Russia on the introduction of scientific and technological advances into the national economy in the following main fields:

1. Building materials and heat-resistant, heat-insulating and special materials;

2. Technological processes;

3. Technological equipment and machines;

92-26489 3284j (E) 220692 220692

220692

/...

4. Special equipment, apparatus and machines;

5. Cryogenic technology;

6. Automatic control systems;

7. Software and procedures;

8. Television, measurement technology and instrumentation;

9. Testing installations and experimental rigs;

10. Transport and power units.

Among the most interesting developments in recent years, mention may be made of:

1. Inexpensive stainless steel, which reduces the demand for nickel;

2. High-strength steel, which requires no heat treatment after welding and retains its properties at the lowest temperatures;

3. Aluminium alloys with scandium, which reduce a product's mass by 200 kg/t compared to existing aluminium alloys;

4. New ceramic materials for use in textile machinery construction, the building industry and water supply fittings;

5. Carbon - carbon composites, compatible with living tissues, for use in orthopaedics and stomatology;

6. VAL-8 high-strength cast aluminium alloy (reduces labour input four to five times, and design weight by 35 per cent);

7. Bi-metallic sheets and strips of "aluminium alloys and corrosion-resistant steel" (reduce design mass by 25 per cent and significantly extend working life);

8. Technology for seamless hardened large-size casings, giving greater reliability and lower casing mass;

9. Electron-beam welding of longitudal seams with local vacuum processing;

10. Vacuum metallizing technology for applying protective coverings to nickel-free alloys;

11. The Stand-Start universal complex, designed for ground experiments and carrier rocket launches.

There is a wide range of technological advances of particular interest to users of scientific and technological applications in Russia. For instance, the guidance system for the "Buran" spacecraft may be applied to the automatic flight and landing of heavy aircraft, steering of ships and dispatch control tasks;

The system of closed-circuit television can be used to control production processes and, by means of modular construction, facilitates the construction of television systems of varying configurations;

The turbo-drive rocket motor can be effectively used in aircraft and submarines as an emergency power source;

Also of interest from the standpoint of international cooperation are those lines of work which will facilitate the implementation of possible programmes on:

- Improvement of the state of the environment and resource conservation;

- Improvement of medical services to the population.

Among the most significant scientific and technical achievements in these spheres, mention should be made of the following:

Environment and resource conservation

- Environment-friendly electrochemical generators, ranging from a few kilowatts to tens of megawatts in capacity, for supply of electricity and heat to human settlements and facilities remote from the main energy system;

- High-strength chrome-nickel alloys capable of functioning in hydrogen which can be used to construct environment-friendly engines and motors for air and ground transport;

- Non-toxic polymer, composition and varnish and paint coatings and materials;

- Effective thermal insulation materials which substantially reduce heat transfer and, consequently, fuel consumption on the heating of residential buildings and on serving the technical needs of industry;

- High-strength steels and alloys, sparingly alloyed steels, multilayer steels and composites which reduce the consumption of rare and expensive metals and substantially increase the service life and reliability of industrial plant, equipment and machinery;

- Highly wear-resistant ceramic water-supply system fittings which reduce water loss to a minimum;

- Dispersion-hardening niobium alloys which substantially increase the lifetime of sodium lamps;

- Protective coating technology and products which reduce by several times the consumption of environmentally harmful electrolytes.

Medicine

- Carbon composition materials, compatible with living tissues, for use in orthopaedics and stomatology, which significantly reduce recovery times;

- Cryogenically-hardened steel pins and plates for use in complex traumas and fractures which reduce the recovery time by a factor of ten and eliminate the need for post-operative rehabilitation;

- Radio-transparent cryostats for the placement and freezing to the temperature of liquid helium of super-conductor interferometer gauges designed to measure the extremely small magnetic fields of biological objects (brain, heart);

- Means of monitoring the condition of cosmonauts and maintaining their vital functions and capacity for work which can be used as a basis for the production of improved multifunction equipment used in curing the sick;

- Barometric systems designed for the conduct of operations, the maintenance of the patient's vital functions and the promotion of his recovery which maintain the necessary gas environment and climatic conditions and afford the possibility of multifunctional monitoring.